IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) ~~Method~~ A method for supervising an OFDM wireless communication system including a MAC layer and a PHY layer, said PHY layer including a supervisor unit, ~~wherein~~ the method comprising the act of:

~~a)~~ inputting into the supervisor unit a first set of input data comprising a target bit rate (Target_Rate) and a target bit error rate (Target_BER) ~~is inputted into the supervisor unit; and~~

~~b)~~ processing by the supervisor unit the first set of input data ~~is processed by the supervisor unit~~; and

~~c)~~ outputting from the supervisor unit a code rate C, ~~and~~ a set of codes $M=\{M_i\}$ for specifying constellations for sub-channels ~~are outputted from the supervisor unit~~, an actual rate actually determined for a current transmission and an actual bit error rate

(BER) actually determined for the current transmission).

2.(Currently Amended) The method of claim 1 ~~for minimizing transmission power in the OFDM wireless communication system~~, said PHY layer including the supervisor unit for controlling performance of the PHY layer, ~~wherein:~~

~~a)~~ wherein the processing ~~of first and second sets of input data~~ is for minimizing transmission power in ~~a~~ the wireless communication ~~network~~ system and comprises the acts of:

~~b)~~ calculating ~~the~~ maximum bit rate achievable by every couple M/C, identified by modulation k and code-rate i, with all sub-channels turned on;

~~c)~~ eliminating the couples M/C for which ~~the~~ a maximum achievable bit rate is less than ~~the~~ requested ~~one~~ bit rate;

~~d)~~ and for every couple useful M/C:

~~d1)~~ calculating ~~the~~ a minimum number of sub-channels required to achieve the bit rate B;

~~d2)~~ deriving, from simulation-based curves, ~~the~~ a signal to noise ratio (SNR) necessary to obtain ~~the~~ a required BER ~~in the AWGN case~~ and use it to derive the SNR required by ~~the~~ a worst sub-

channel;

e) calculating ~~the~~ a total received power for all $N^{(k,i)}$ sub-channels;

f) selecting and outputting ~~an "optimum"~~ a selected couple M/C ($(M,C)_{min\_pow}$) which minimizes $P_{r,\min\_pow} = \min_{(k,i)}\{P_{r,tot}^{(k,i)}\}$.

3. (Currently Amended) The method of claim 2, wherein, in case ~~the~~ a starting information is ~~the~~ a maximum transmit power and the Target_BER, the processing ~~of the first and second set of input data for minimizing transmission power in a wireless communication network system~~ act further comprises the acts of:

a) calculating ~~the~~ a maximum received power;

b) calculating ~~the~~ a minimum SNR on ~~the~~ a weakest sub-channel, for every number j of sub-channels considered and storing the result;

c) for every couple M/C, calculating ~~the~~ a number of sub-channels having an SNR above ~~the~~ threshold yielding ~~the~~ a BER requested by the MAC ~~sub-layer~~ layer;

d) calculating the bit rate achievable using $N^{(k,i)}$ sub-

channels;

e) finding ~~the~~ a maximum M/C ~~(called $(M,C)_{max}$)~~ that yields the maximum bit rat; and

f) selecting and outputting ~~an "optimum"~~ a maximum couple M/C ~~(called $(M,C)_{max}$)~~.

4.(Currently Amended) The method of claim 2, wherein, in case ~~the~~ a starting information is ~~the~~ a maximum transmit power and the Target_Rate, the processing ~~of the first and second set of input data for minimizing transmission power in a wireless communication network system~~ act further comprises the acts of:

~~a)~~ calculating ~~the~~ a maximum receive power;

~~b)~~ for every M/C, calculating ~~the~~ a number of sub-channels used to achieve the bit target rate ~~Target Rate~~;

c) selecting the SNR on the worst sub-channel;

d) calculated from ~~the~~ a BER-SNR curve, the BER corresponding to the worst sub-channel for modulation of k and code-rate i;

e) finding ~~the~~ a minimum couple M/C ~~(called $(M,C)_{min}$)~~ that yields the minimum value; and

f) selecting and outputting ~~an "optimum"~~ minimum couple M/C

~~(called $(M,C)_{min}$)~~.

5.(Currently Amended) ~~The method of claim 1 for minimizing processing power in an OFDM wireless communication system including a MAC layer and a PHY layer, said PHY layer including a supervisor unit controlling performance of the PHY layer, wherein:~~

~~a) processing of first and second sets of input data~~ A method for supervising an OFDM wireless communication system including a MAC layer and a PHY layer, said PHY layer including a supervisor unit, the method comprising the act of:

inputting into the supervisor unit a first set of input data comprising a target bit rate (Target Rate) and a target bit error rate (Target BER);

processing by the supervisor unit the first set of input data; and

outputting from the supervisor unit a code rate C, a set of codes $M=\{M_i\}$ for specifying constellations for sub-channels, an actual rate actually determined for a current transmission) and an actual bit error rate (BER) actually determined for the current transmission;

wherein the processing act further comprises the acts of:

~~b)~~ comparing Target-Rate and Rate_(N)=C_*log(M_)*N for each available N (from 1 to max_available_N);

~~c)~~ selecting and accepting ~~the~~ values of N satisfying Target_Rate≤Rate_(N);

~~d)~~ ordering ~~these~~ the values in ascending order to get [N_{min}, N_{max}];

~~e)~~ assuming $N_{opt}=N_{min}$; and

~~f)~~ providing N_{opt} and minimum TX power parameters as an output.

6.(Currently Amended) The method of claim 5, further comprising the acts of, after assuming $N_{opt}=N_{min}$:

checking if ~~the~~ a transmission power constraint is satisfied, if so providing N_{opt} and minimum TX power parameters as output, if not

proceeding to check if another value is available in ~~the~~ a set [N_{min}, N_{max}]), if so, choosing ~~the~~ a next (next_N), setting N to next_N and jumping to select and accept the values of N that satisfy Target_Rate≤Rate_(N), if not

setting $N_{opt}=0$ and providing N_{opt} and minimum TX power

parameters as the output.

7.(Currently Amended) The method of claim 6, wherein the processing ~~of the first and second set of input data for minimizing transmission power in a wireless communication network system~~ further comprises the acts of:

selecting ~~the~~ a best window position among ~~the~~ possible ones:

(max_available $N-(N_{opt}-1)$); and

running ~~the~~ an adopted TX power minimization algorithm on the selected window.

8.(Currently Amended) The method of claim 1, further comprising ~~feeding the first set of input data as to the QoS requirements at the PHY layer from the MAC layer to the supervisor unit;~~ the acts of:

feeding a second set of input data including channel power transfer functions $H=\{|H_i|^2\}$: (index i refers to the i^{th} sub-carrier) from the PHY layer to the supervisor unit;

processing the first and second set of input data for minimizing processing and transmission power in ~~a~~ the OFDM wireless

communication system; and

outputting N, modulation, coding parameters and transmission power parameters to the PHY layer.

9.(Currently Amended) The method of claim 8, wherein the feeding of the first set of input data ~~as to the QoS requirements at the PHY layer from the MAC layer to the supervisor unit~~ comprises feeding a Max_Delay (max tolerable delay).

10.(Currently Amended) The method of claim 8, wherein the outputting of coding parameters and transmission power parameters to the PHY layer comprises:

N: IFFT/FFT length;

the C: Code rate data;

B: Block length data;

n: data as to the number of decoding iterations;

the $M=\{M_i\}$: data as to a set of codes to specify ~~the generally~~ different constellations adopted for ~~the~~ different sub-channels (e.g. $M_i=0$ means that the i^{th} sub-channel is OFF, different values specify constellation types in the pre-defined available set);

and $P=\{P_i\}$: data as to a set of ~~the generally~~ different transmission powers adopted for the different sub-channels ~~(e.g.~~, wherein $P_i=0$ means that the i^{th} sub-channel is ~~OFF)~~ in an OFF state.

11. (Currently Amended) The method of claim 8, wherein the outputting further comprising the act of outputting actual QoS data to the MAC layer.

Claim 12 (Canceled)

13. (Currently Amended) ~~The method of claim 11,~~ A method for supervising an OFDM wireless communication system including a MAC layer and a PHY layer, said PHY layer including a supervisor unit, the method comprising the act of:

inputting into the supervisor unit a first set of input data comprising a target bit rate (Target Rate) and a target bit error rate (Target BER);

processing by the supervisor unit the first set of input data; and

outputting from the supervisor unit a code rate C, a set of

codes $M=\{M_i\}$ for specifying constellations for sub-channels, an actual rate actually determined for a current transmission) and an actual bit error rate (BER) actually determined for the current transmission;

wherein the MAC layer requests a feedback specifying a Feedback_mode ~~[0/1] (one~~, where one bit information is used to specify if MAC is interested to have feedback information on ~~the "current"~~ a current maximum available rate or ~~the~~ a minimum available ~~BER), and, furthermore, specifies~~ BER, and specifying a Service_mode ~~[0/1] (one~~, where one bit ~~information~~ data is used to specify if MAC QoS requirements refers to a Rate guaranteed service or to a BER guaranteed ~~service)~~ service.

14. (Currently Amended) The method of claim 11, wherein the outputting ~~of actual QoS data to the MAC layer additionally comprises, depending on the Feedback_mode request from MAC layer,~~ act further comprises the act of outputting:

a MAC_return comprising a Max_available_Rate (maximum available rate for ~~the~~ a current channel condition as far as BER and tolerable delay requirements are concerned); or

a Min_available_BER (minimum available BER for the current channel condition as far as rate and tolerable delay requirements are concerned) ~~is provided~~ after the ~~optimization~~ processing act.

15. (Currently Amended) The method of claim 1, wherein the processing ~~of the first and second set of input data~~ act is for minimizing processing and transmission power in a wireless communication network system and further comprises the act of finding N, the M/C couple and ~~the~~ ON sub-channels required to fit the Target_Rate and the Target_BER requirements with ~~the~~ a minimum power, given ~~the~~ a current channel condition.

16. (Currently Amended) The method of claim 15, wherein, in case ~~the~~ channel conditions prevent achieving ~~the~~ a required QoS even with ~~the~~ a maximum available transmission power, ~~the~~ a supervisor algorithm ~~(depending on Service_mode)~~ finds ~~the~~ an M/C couple, ~~the~~ a number and ~~the~~ a position of ~~the~~ ON sub-channels required to get

~~the Maximum Rate~~ a maximum rate compatible with the Target_BER requirement, given the current channel condition and ~~the~~ a maximum

power allowed by ~~the~~ system specifications, or

~~the Minimum~~ a minimum BER compatible with the Target_Rate ~~requirement~~, given the current channel condition and the maximum power allowed by the system specifications.

17. (Currently Amended) An OFDM wireless communication system including a MAC layer and a PHY layer, said PHY layer including ~~a~~ the supervisor unit, wherein the supervisor unit is configured to perform the method of claim 1.

18. (Currently Amended) A supervisor unit in ~~an~~ the OFDM wireless communication network system including ~~a~~ the MAC layer and ~~a~~ the PHY layer including said supervisor unit, wherein the supervisor unit is configured to perform the method of claim 1.

19. (Currently Amended) An interface unit in ~~an~~ the OFDM wireless communication system including ~~a~~ the MAC layer and ~~a~~ the PHY layer, said PHY layer including a supervisor unit, said interface being located between the supervisor unit and the MAC layer, wherein said interface unit is configured to perform the

method of claim 1.

20. (Currently Amended) A computer-readable medium containing a computer-readable program for use in ~~an~~ the OFDM wireless communication system including ~~a~~ the MAC layer and ~~a~~ the PHY layer, said PHY layer including a supervisor unit, wherein the program, when implemented in the supervisor and run in the supervisor unit, causes the supervisor to perform the method of claim 1.